Objective 1: Multiply fractions

- To multiply two fractions
  - Multiply both numerators together for the new numerator
  - Multiply both denominators together for the new denominator

\[
\frac{2}{3} \cdot \frac{5}{4} = \frac{10}{12} = \frac{5}{6}
\]

Objective 2: Multiply and simplify fractions

- There are two methods to multiply fractions
  
  - Method #1
    - Multiply the numerators and multiply the denominators
    - Simplify the product

\[
\frac{5}{6} \cdot \frac{3}{4} = \frac{15}{24} = \frac{5}{8}
\]

- Method #2
  - Find the prime factors off all the numbers in the problem
  - Cancel out any numerator factors with any like denominator factors
  - Multiply the remaining factors

\[
\frac{6}{8} \cdot \frac{10}{15} = \frac{60}{120} = \frac{1}{2}
\]
Objective 3: Multiply mixed numbers

- To multiply mixed numbers
  - Change the mixed number to an improper fraction
  - Follow one of the two methods for multiplying fractions
  - Change answer back to a mixed number

\[ \frac{18}{20} \cdot \frac{30}{-32} = \]

\[ 3\frac{1}{6} \cdot 19\frac{1}{2} = \]

\[ -3\frac{1}{3} \cdot 2\frac{2}{5} = \]

Objective 4: Multiply rational expressions

- Multiply rational expressions the same way that you multiply fractions
- Pick one of the two methods for multiply fractions
- Remember to treat variables like they are primes

\[ \frac{3\alpha}{\beta^2} \cdot \left( -\frac{10\alpha b^4}{\gamma^4} \right) \]

Objective 5: Simplify fractions raised to a power
Objective 6: Solve applications involving multiplying fractions

- Remember to look for key words
- To identify multiplication with fractions, look for the words “find a fraction of an amount”

Objective 7: Calculate the area of a triangle

- The formula for the area of a triangle is
  \[ A = \frac{1}{2} \cdot bh \]

Objective 8: Calculate the radius and diameter of a circle

- Circle – A collection of points that are equally distant from a central point, called the center
- Radius – The distance for the center to any point on the circle
- Diameter – The distance across a circle along a straight line through the center
- The formula for the diameter of a circle is
  \[ D = 2r \]

- What is the diameter if a circle has a radius of \( \frac{2}{3} \) ft?
5.3 Multiplying Fractions, Mixed Numbers, and Rational Expressions

- The formula for the radius of a circle is
  \[ r = \frac{D}{2} \]
  - What is the radius if a circle has a diameter of 25 ft?

**Objective 9:** Calculate the circumference of a circle

- Circumference – The distance around a circle
- \[ \pi = \frac{22}{7} \]
- The formula for the circumference of a circle is
  \[ C = \pi D \quad \text{or} \quad C = 2\pi r \]

- Calculate the circumference of a circle with a diameter of \( \frac{55}{6} \) ft
- Calculate the circumference of a circle with a radius of \( \frac{1}{6} \) ft